~~MRID 00118409~~
MRID 00118048

FORM I

TDMS DATA EVALUATION RECORD Page 1 of 9

CASE GS 0229 Norflurazon PM 06/04/84

CHEM 105801 Norflurazon (4-chloro-5(methylamino)-

BRANCH EEB DISC

FORMULATION 96.6% A.I.

FICHE/MASTER ID FAONOR04

CITATION: Early-life stage toxicity study in the rainbow trout on Norflurazon conducted at EG&G Bionomics (BW-82-5-1165 Sandoz Project T-1733) Acc. ~~#248839~~ 248829 Dated 10/18/83

SUBST. CLASS= S

OTHER SUBJECT DESCRIPTORS
PRIM:

DIRECT REVIEW TIME= 2.0 (MH) START DATE 5/30/84 END DATE 6/7/84

REVIEWED BY: Russel Farringer, III
TITLE: Wildlife Biologist
ORG: EEB/HED
LOC./TEL: 557-7560

SIGNATURE: Russel Farringer III DATE: 6/7/84

APPROVED BY:
TITLE:
ORG:
LOC./TEL:

SIGNATURE: DATE:

This study was scientifically sound. The MATC of rainbow trout continuously exposed to a range of Norflurazon concentrations (0.77, 1.5, 3.3, 5.5, 11.2) during embryro to larvae stage is >0.77 mg/l <1.5 mg/l (based upon survival and growth of larva). This study fulfills the requirement for the aquatic fish early life cycle study.

duplicate

DATA EVALUATION RECORD

1. CHEMICAL: Norflurazon (EPA Reg. No. 11273-13,19)

2. FORMULATION: 96.6% A.I.

3. CITATION: Early-life stage toxicity study in the rainbow trout on Norflurazon conducted at EG&G Bionomics (#BW-82-5-1165 Sandoz Project T-1733) Acc.# 248839 Dated 10/18/82

4. REVIEWED BY: Russel Farringer, Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. DATE REVIEWED: January 4, 1983

6. TEST TYPE: Fish Early-life Stage

TEST SPECIES: Rainbow Trout

7. REPORTED RESULTS: Percent viability was not statistically significant ($p \leq 0.05$) between treatment and control groups. No toxicological signs were observed at concentration 0.77 mg/l. The MATC of Rainbow trout exposed to Norflurazon during embyro to larvae stage is >0.77 mg/l. <1.5 mg/l.

8. REVIEWER'S CONCLUSIONS: This study was scientifically sound. The MATC of Rainbow trout continuosly exposed to a range of Norflurazon concentrations (0.77, 1.5, 3.3, 5.5, 11.2) during embryro to larvae stage is >0.77 mg/l <1.5 mg/l.

MATERIALS AND METHODS

TEST PROCEDURES

This study generally follows the EPA guideline requirements of July 10, 1978 and protocols that were delineated in that document in regards to flow-though aquatic testing with fish. The nominal test levels were determined to be present at or above the stated level by GLC-ECD. The embryo and larvae exposure was initiated within 2 hours after egg fertilization and continued through 30 days post swim-up. Fifty embryos were used in each test chamber with two test chambers power control, solvent control and nominal concentration were utilzed. An unknown number of larvae were utilized in replicate tanks (2) for each test level. Larvae were fed brine shrimp (Artemia solina nauplii) three times daily on weekdays and twice daily on weekends and holidays. Aquaria were brushed and siphoned at least twice each week or as necessary to remove excess food and fecal matter. Solvent controls (dimethyl formamide at 100 microliters/L) were utilized at the highest solvent/ toxicant dosing. DO, pH, and temperature were measured daily in one set of replicate tanks with all tanks being measured at least once a week. All test solutions were sampled on test day 0, day of hartch and weekly thereafter to assure that the nominal concentration and actual concentration were relatively the same. A stock sample was collected from the primary holding tank at each sample interval.

STATISTICS

Percentage hatch of embryos and survival, length and weight of larvae after 30 days exposure, were subjected to analysis of variance (Steel and Torrie, 1960, completely randomized block design, P=0.05). Data for percentage hatch and percentage survival were transformed to arcsin$\sqrt{\text{percentage}}$ prior to analysis. If treatment effects were indicated, the means of these parameters were compared to those from the control and solvent control using Dunnett's procedure (Steel and Torrie, 1960). When a treatment mean was significantly different from the control means P=0.05), that treatment was considered to be an effect level. Based on these data, the MATC of Norflurazon to fathead minnow embryos and larvae was estimated.

RESULTS

The Maximum Acceptable Toxicant Concentration (MATC) of Rainbow Trout when continuously exposed to Norflurazon during the embryo to larvae stage is >0.77 mg/l <1.5 mg/l.

REVIEWER'S EVALUATION

TEST PROCEDURE

This study appears to have been conducted following guideline requirements for an embryo to larvae study.

STATISTICAL RESULTS

ANOVA analysis was performed on this data set. The independent variable was treatment level, dependent variables were percentage of hatch and survival, length and weight.

S T A T I S T I C A L A N A L Y S I S S Y S T E M

OBS	TREAT	HAT	SUR	LEN	WT
1	C	26	88	80	46
2	C	30	90	88	45
3	CS	25	80	86	46
4	CS	27	86	81	47
5	T1	34	79	88	46
6	T1	31	87	88	46
7	T2	29	82	64	42
8	T2	34	83	56	42

S T A T I S T I C A L A N A L Y S I S S Y S T E M

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TREAT	4	C CS T1 T2

NUMBER OF OBSERVATIONS IN DATA SET = 8

S T A T I S T I C A L A N A L Y S I S S Y S T E M

(NOTE: C = Control; CS = Solvent Control; T1 = 0.77; T2 = 1.5)

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: SUR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	57.37500000	19.12500000	1.46	0.3522	0.522184	4.2937
ERROR	4	52.50000000	11.16666667		STD DEV		SUR HAT MEAN
CORRECTED TOTAL	7	109.87500000			3.62284419		84.37500000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR >
TREAT	3	57.37500000	1.46	0.3522	3	57.37500000	1.46	0.3522

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: SUR
NOTE: THIS TEST CONTROLS ERROR RATES AT DIFFERENT LEVELS
DEPENDING ON THE NUMBER OF MEANS BETWEEN EACH PAIR
BEING COMPARED. ITS OPERATING CHARACTERISTICS SOMEWHAT
RESEMBLE FISHER'S UNPROTECTED LSD TEST.
ALPHA=0.05 DF=4 MSE=13.125
MEANS WITH THE SAME LETTER ARE NOT SIGNFICANTLY DIFFERENT.

DUNCAN GROUPING	MEAN	N	TREAT
A	82.000	2	C
A			
A	83.000	2	CS
A			
A	83.000	2	T1
A			
A	82.500	2	T2

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: LEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	947.37500000	324.79166667	16.98	0.0097	0.927204	5.5445
ERROR	4	76.50000000	19.12500000		STD DEV		LEN MEAN
CORRECTED TOTAL	7	1050.87500000			4.37321392		78.87500000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR >
TREAT	3	974.37500000	16.98	0.0097	3	974.37500000	16.98	000097

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: LEN

NOTE: THIS TEST CONTROLS ERROR RATES AT DIFFERENT LEVELS DEPENDING ON THE NUMBER OF MEANS BETWEEN EACH PAIR BEING COMPARED. ITS OPERATING CHARACTERISTICS SOMEWHAT RESEMBLE FISHER'S UNPROTECTED LSD TEST.

ALPHA=0.05 DF=4 MSE=19.125

MEANS WITH THE SAME LETTER ARE NOT SIGNFICANTLY DIFFERENT.

DUNCAN GROUPING	MEAN	N	TREAT
A	88.000	2	T1
A			
A	84.000	2	C
A			
A	83.500	2	CS
B	60.000	2	T2

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: WT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	25.00000000	8.33333333	33.33	0.0027	0.961538	1.1111
ERROR	4	1.00000000	0.25000000		STD DEV		WT MEAN
CORRECTED TOTAL	7	26.00000000			0.50000000		45.00000000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR >
TREAT	3	25.00000000	33.33	0.0027	3	25.00000000	33.33	0.0027

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE: WT

NOTE: THIS TEST CONTROLS ERROR RATES AT DIFFERENT LEVELS
DEPENDING ON THE NUMBER OF MEANS BETWEEN EACH PAIR
BEING COMPARED. ITS OPERATING CHARACTERISTICS SOMEWHAT
RESEMBLE FISHER'S UNPROTECTED LSD TEST.

ALPHA=0.05 DF=4 MSE=0.25

MEANS WITH THE SAME LETTER ARE NOT SIGNFICANTLY DIFFERENT.

DUNCAN GROUPING	MEAN	N	TREAT
A	45.500	2	CS
A			
A	46.000	2	T1
A			
A	45.500	2	C
B	42.000	2	T2

DISCUSSION/RESULTS

Based on the results of our statistical analysis we concur with the following statements made by the Testing laboratory.

"Percentage viability of rainbow trout embryos was unaffected by exposure to mean measured Norflurazon concentrations as high as 11.2 mg/l (Table 3). Percentage hatch of viable embryos exposed to mean measured concentrations of 11.2 and 5.5 mg/l Norflurazon was significantly reduced as compared to percentage hatch of viable control and solvent control embryos. Embryos began hatching on day 23 of exposure. None of the embryos exposed to 11.2 mg/l Norflurazon hatched successfully while newly hatched larvae exposed to 5.5 mg/l Norflurazon began dying after hatching. Mortality continued until day 9, post-hatch, at which time no surviving larvae remained in this treatment. Mortality and lethargic behavior were observed among larave exposed to 3.3 mg/l Norflurazon on day 2, post hatch. These trends continued until day 17, post-hatch at which time no surviving larvae remained in this treatment. Lethargic behavior and mortality were observed among larvae exposed to 1.5 mg/l Norflurazon during the initial 15 days of exposure. Beyond day 15, post-hatch, surviving larvae no longer appeared lethargic and none died. Larvae survival was unaffected by exposure to a mean measured Norflurazon concentration of 0.77 mg/l. Mean total length and average wet weight of larvae exposed to 1.5 mg/l Norflurazon were signficantly reduced as compared to control and solvent control larvae. Larvae exposed to 1.5 mg/l Norflurazon also appeared to have light pigmentation as compared to larvae in both control groups. Mean total length, average wet weight and pigmentation of larvae exposed to 0.77 mg/l Norflurazon was compariable to growth and pigmentation of control and solvent control larvae."

"Based on the reduced percentage survival and reduced growth of larvae exposed to a mean measured Norflurazon concentration of 1.5 mg/l, the MATC of this compound for the rainbow trout was estimated to be >0.77 <1.5 mg/l."

CONCLUSIONS

Category: Core